



TEN BY '10

Top 10 Things To Do by 2010
to Reduce USMC Energy Risks



FACILITIES ENERGY & WATER
MANAGEMENT PROGRAM

CAMPAIGN PLAN

UNITED STATES MARINE CORPS

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On the Cover:

Cover photo is of a photovoltaic roof-top system at MCB Camp Pendleton. Inset photos from the top are the 1.5 Megawatt wind turbine at MCB Barstow, bouy demonstration project at MCB Hawaii, photovoltaic lighting at MCB Camp Pendleton, and reclaimed water for irrigation at MCB Hawaii.



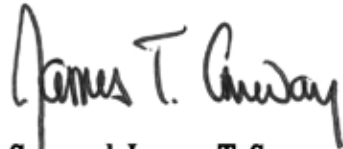
A Message from the Commandant of the Marine Corps

We face an uncertain future. While electricity, fuel, and water continue to power our bases and stations, the cost of energy is on the rise — any interruption in these resources puts our installations and training areas at risk. Energy conservation, therefore, becomes an issue of combat readiness.

When our Nation calls, we must always be prepared to respond. Given the scarcity of resources in the world, populations will soon go to war over basic human needs, such as food and potable water. Today alone, at least a billion people are without access to an improved water supply. In 15 years, more than half of the population of the world will live under water stressed conditions, while global consumption of oil will continue to rise.

As Marines, we take pride in providing the best value to the Nation. This extends to energy conservation aboard our facilities. It is with this intent in mind that we publish our Facilities Energy & Water Management Program Campaign Plan. It contains my intent and guidance for the implementation of measures that will make us better stewards of the energy and water resources used aboard our facilities. Finally, it supports our Nation's pledge to reduce green house gas emissions and dependence on foreign oil. Together, we will shape a Marine Corps that is ready to meet the challenges of the future.

Semper Fidelis,


General James T. Conway
*United States Marine Corps
Commandant of the Marine Corps*

Energizing Marines to be Energy Innovators

Drive Efficient Usage; Create Renewable Energy Resources

The Marine Corps must take aggressive action toward more efficient energy and water usage and toward developing renewable energy resources. This is the Corps' opportunity to turn its energy challenges into opportunities, to be less energy dependent, and to further enhance support of the operating forces. It's a critical undertaking.

Here's why:

- Energy and water resources are essential elements to sustain and enhance the Marine Corps' combat readiness.
- Marine Corps installations primarily rely on off-site power generation and are dependent on commercial grids and other national infrastructure for power distribution. This dependence leaves Marine Corps installations vulnerable to power disruption, creating a significant risk to critical mission support execution.
- Global demand for energy is forecast to grow 57% over the next 25 years. U.S. demand for energy is expected to increase 31% within 25 years. Electricity demand is expected to grow at least 40% by 2032.
- The U.S. imports over 58% of its oil and depends on unstable countries for supply. Worldwide demand is at 97% of refining capacity. These factors directly link our country's economy to the availability of oil, making it vulnerable to any disruption in oil refining and distribution capacity.
- 50% of U.S. electrical generation relies on coal, a fossil fuel; while 85% of U.S. greenhouse gas emissions result from energy-consuming activities supported by fossil fuels.
- Competition for water – resulting from population growth, industrial demands, and aquatic ecosystem requirements – demonstrates the need for conservation to ensure a high-quality, sustainable water supply.

A New Campaign – Commandant's Intent

Stemming from these energy issues, the Marine Corps is beginning, immediately, a new Facilities Energy and Water Management Campaign. While the program's goals are long-term, the only way we will achieve them is by starting today with short-term actions. *Ten by '10* will develop ongoing behaviors for the entire Corps. The Commandant's intent for our overarching effort is:

- Ensure a secure and reliable energy and water supply to support the operating forces and their families through the efficient management of energy and water facilities infrastructure.
- Achieve energy and water efficiency goals mandated by Congress and the President to support national efforts to lower greenhouse gas emissions, reduce our nation's dependence on foreign oil, and promote conservation of water supplies.
- Reduce life cycle operating costs of Marine Corps facilities and manage future commodity price volatility.

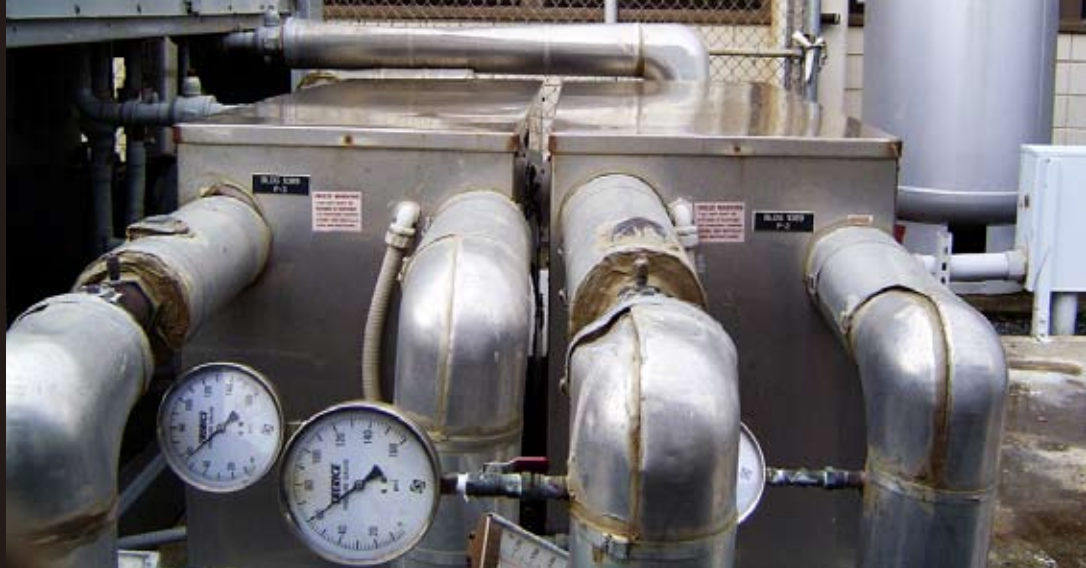
A New Campaign – Long-Term Goals

To fulfill the Commandant's intent, the Facilities Energy and Water Management Program – and every Marine – will focus on three long-term energy goals:

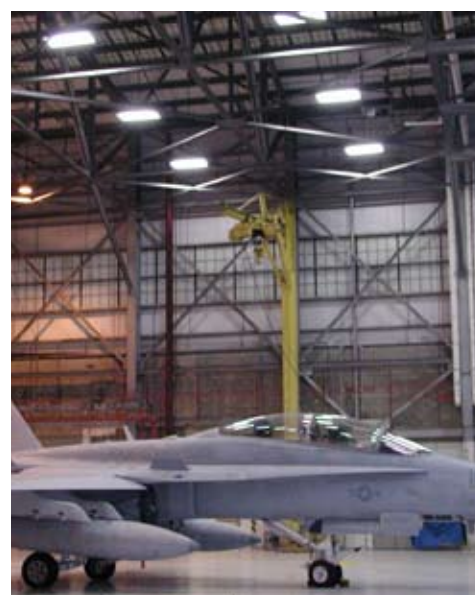
1. Reduce energy intensity 30% by 2015 relative to 2003 baseline.
2. Reduce water consumption intensity 16% by 2015 relative to 2007 baseline.
3. Increase the percentage of renewable electrical energy consumed to 25% by FY 2025.

And we will achieve these goals by reducing energy and water intensity of existing facilities, increasing energy and water efficiency in new construction, and expanding the use of renewable energy resources.

The Annual Installation Energy and Water Management Report and data reported through the Defense Utility Energy Reporting System (DUERS), will be the tools to measure the achievement of these goals.



Marine Corps Base Hawaii
Chiller Desuperheater for Hot Water



Marine Corps Air Station Beaufort
Hangar Lighting

Sources: Annual Energy Outlook (DOE/EIA-0383(2007), International Energy Outlook 2007 (DOE/EIA-0484(2007), Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2005 (April 2007) (EPA 430-R-07-002).

Intensity is defined as consumption per facilities square footage.



OUR ENERGY

TOP 10 BY 2010 >>

Marine Corps Air Ground Combat Center Twentynine Palms
1 MW Photovoltaic System

Work Begins Right Now

Every Marine, civilian Marine, and visitor bears responsibility for being a good steward of our energy and water resources. Residents in family housing also have a responsibility to guard against wasteful energy and water use. Energy and water conservation can only be successful if every individual considers it his or her own responsibility and priority.

By our leadership and their teams taking the 10 actions outlined in this *Ten by '10* Campaign Plan, we will move the Marine Corps toward a more secure and diverse energy supply, more stable energy costs, a reliable water supply, and a cleaner environment. These actions are:

1 Create an organizational structure that maintains a command committed to the efficient use of energy and water resources.

Operational readiness, quality of life, and safety shall not be compromised to achieve energy and water efficiencies; however, these should not be viewed as incompatible goals. The energy efficient operation of assets will be consistent with mission requirements. Prudent energy and water management will be part of operational procedures, planning criteria, and scheduling. Energy efficiency and sound energy and water management will be the standard for all installation and operational units.

2 Provide management and resources for the execution of facilities energy and water management programs.

Installation Commanders will staff energy manager positions to provide management and technical support and serve as primary points of contact for facility energy management issues. Primary responsibilities will be implementing an aggressive audit program and identifying and prioritizing energy retrofit projects.

Resource Efficiency Managers (REMs) will be contracted to support facilities energy and water management programs, where cost effective. Commands will stand up a Utility Conservation and Appraisal Board to serve in an advisory capacity. Funding levels sufficient to meet energy and water efficiency goals will be programmed and budgeted.

3 Use an integrated approach to optimize energy performance to meet Federal building performance requirements and achieve a Leadership in Energy & Environmental Design (LEED) rating of Silver for new construction and major renovation projects.

To address the implementation of sustainable design principles, the Marine Corps has adopted the U.S. Green Building Council's (USGBC) LEED Green Building Rating System for New Construction and Major Renovation. LEED is a performance-oriented system based on accepted energy and environmental principles where credits are earned for satisfying criteria designed to address specific environmental impacts inherent in the design, construction, operations, and maintenance of buildings.

By following an integrated design process, buildings will use substantially less energy without compromising occupant comfort or building functionality. An integrated design approach

considers the energy-related impacts and interactions of all building components, including the building site; envelope (walls, windows, doors, and roof); heating, ventilation, and air-conditioning (HVAC) system; and lighting, controls, and equipment.

This stands in marked contrast to the traditional design process where there is generally no goal to minimize energy use and costs beyond what is required by codes and regulations.

Basic energy-saving techniques that will be incorporated into building design include:

- Siting and organizing building configuration and massing to reduce loads.
- Reducing cooling loads by eliminating undesirable solar heat gain.
- Using natural light as a substitute for (or complement to) electrical lighting.
- Using natural ventilation whenever possible.
- Using more efficient heating and cooling equipment to satisfy reduced loads.
- Using computerized building-control systems.

4 Demonstrate leadership in implementing cost-effective technology and management practices.

There are significant opportunities to improve the energy and water efficiency of Marine Corps facilities. Installation leadership overseeing all new construction, major renovations, and energy system upgrades will, at a minimum, evaluate the cost effectiveness of incorporating emerging technologies, including, but not limited to, the following:

- Building Integrated Photovoltaics
- Cool Roofs
- Daylighting
- Ground Source Heat Pumps
- Heat Recovery Ventilation
- High-Efficiency Chillers
- Occupancy Sensors
- Premium Efficiency Motors
- Radiant Heating
- Solar Water Heating
- Variable Air Volume (VAV) systems

Marine Corps Air Station Yuma
LED Taxiway Lighting

5 Procure energy-efficient equipment and products.

All acquisitions of relevant products will meet ENERGY STAR® and Federal Energy Management Program (FEMP) requirements. ENERGY STAR®-qualified or FEMP designated products range from office fax machines and dishwashers to water-cooled chillers and industrial luminaires. Purchase of these energy-efficient products is mandatory and can be waived under only two conditions: no efficient product meets technical needs, or no efficient product is cost-effective for a specific application.

Commands will incorporate ENERGY STAR® and FEMP specifications into standard language for solicitations, offer evaluation criteria, and contract documents that include provision of energy-consuming products for federal use. [Such contracts include those for construction, design, design/build, renovation, services, and facility maintenance and operation.] New vending service contracts will require machines to meet ENERGY STAR® specifications. Cold drink machines currently in operation which do not meet ENERGY STAR® requirements will be equipped with energy efficient control devices such as the Vending Miser®.

6 Phase out use of incandescent bulbs.

The Marine Corps will immediately begin phasing out the use of incandescent bulbs with the goal of replacing all incandescent bulbs by 2010 unless operational conditions mandate their use. More efficient lighting will include compact fluorescent light (CFL) and light emitting diode (LED) bulbs, which consume significantly less electricity than older incandescent bulbs. Use of ENERGY STAR® lighting will not only result in reduced electricity consumption, but also lower operational costs through reduced heat gain and longer operational life. Proper environmental disposal procedures of used fluorescent lights should be followed.


7 Evaluate viability of power purchase and leasing agreements to implement large-scale renewable energy projects and develop geothermal energy resources in a manner that protects the operational mission.

The Marine Corps is committed to taking a leadership position in on-site renewable power development with the assistance of private sector financing and development expertise. Advantages of renewable energy sources such as biomass, geothermal, solar, wind, and ocean include:

- Reliable power supplies and fuel diversification, which enhance energy security for individual facilities.
- Supplementary power for peak-use periods.
- Reduced greenhouse gas emissions associated with energy use.
- Lower risk of fuel spills in environmentally sensitive locations.
- Increased price stability in an uncertain energy economy.

Partnerships may improve life-cycle cost effectiveness of large-scale projects since private companies may be able to take advantage of various tax incentives (for example; investment tax credit, property tax exemption, production tax credit, accelerated depreciation). Other considerations include energy security issues, back-up power needs, whether the electricity will be used on-site (offsetting retail rates), or sold to outside entities at a wholesale power rate.

Geothermal energy is heat from the earth that can be used to generate electricity. The secretary of each military department has the authority to develop geothermal resources on military lands and to keep the proceeds from the sale of electricity generated from those resources for use by the DoD. Industrial-scale geothermal power development at MCAGCC Twentynine Palms and MCAS Yuma should be aggressively pursued, with the assumption that mission impacts will be limited and manageable.



Knowledge of facility energy levels and assets and an understanding of where energy is consumed are critical for effective energy management.

8 Manage utility costs through demand-shedding and peak-shaving strategies.

Commands will use energy management and control systems (EMCS) to monitor building conditions, perform diagnostics, and optimize system performance, particularly for large electrical loads, including HVAC equipment, cooling towers, pumps, water heaters, and lighting. Distributed energy resources for on-site generation such as micro-turbines, fuel cells, and combined heat and power will be used when determined to be life cycle cost effective or to provide flexibility and security to mitigate unacceptable operations risk.

9 Use Geospatial Information System (GIS) capabilities to manage metered data.

Knowledge of facility energy levels and assets and an understanding of where energy is consumed are critical for effective energy management. An effective metering program will include a strategy for extracting useful information. Utility data will be made available not only to budgeting and maintenance staff, but also to all installation and unit leadership so efficiencies can be achieved.

GIS is a collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. The Marine Corps Installations and Environment Geospatial Program – more commonly known as GEOFidelis – supports the business management and decision-making processes of the Marine Corps installations and environmental community. GIS will use metering data to make energy consumption data readily available, providing commands the ability to make near real-time decisions on operations and energy usage.

10 Implement training and awareness programs to emphasize user-controlled reductions.

Key energy management personnel will obtain a Certified Energy Manager (CEM®) credential through the Association of Energy Engineers. Design personnel will receive training in energy-efficient technologies and applications and life-cycle costing. Operations and maintenance personnel will receive training in the application of specific energy and water efficiency procedures. Key energy management personnel will attend the annual energy workshop sponsored by the Department of Energy (DOE) and co-sponsored by DoD and the General Services Administration.

Commands will increase awareness and publicize program goals, tools, and progress at different organizational levels through web sites, conferences, e-mails, displays, reports, newsletters, handbooks, and guidance. Awareness programs will:

- Disseminate information on energy matters and conservation techniques.
- Emphasize resource efficiency at all command levels.
- Relate resource conservation to operational readiness.

Building energy monitor programs will be established to promptly report facility deficiencies and to be alert to energy and water conservation opportunities. Energy conservation awards will be presented to individuals, organizations, and installations to recognize their energy-saving and water-conservation efforts.

KEY RESPONSIBILITIES

FOR SUCCESS >>



Marine Corps Base Hawaii
Solar Hot Water Heating – Family Housing

While everyone has a role in contributing to *Ten by '10* efforts, there are several critical leadership roles that will drive our success.

Deputy Commandant for Installations and Logistics (DC I&L)

DC I&L is responsible for establishing installation energy and water management policy for the Marine Corps per direction from the Commandant and to comply with federally mandated requirements. The Assistant Deputy Commandant for Installations and Logistics (Facilities) oversees program development, management, and program execution. The Facilities Branch (HQMC LFF) provides direct support and develops guidance, as appropriate. Director Contracts Division will ensure implementation of policies and procedures for the acquisition of energy and water efficient equipment meeting ENERGY STAR® and DOE FEMP criteria.

Deputy Commandant for Plans, Policy, and Operations (DC PP&O)

DC PP&O will ensure a viable and aggressive energy efficiency and conservation effort is carried out for all

units in PP&O's area of responsibility without adverse impact to operational missions.

Deputy Commandant for Manpower and Reserve Affairs (DC M&RA)

DC M&RA will ensure that policy pertaining to procurement and Non-Appropriated Funding (NAF) construction to support Marine Corps Community Services (MCCS) field activities are in line with direction from the Commandant pertaining to energy-efficient facilities management.

Director Command, Control, Communications and Computers (Dir, C4)

Dir, C4 will ensure that existing equipment and new hardware acquisitions aggressively address energy efficient operations.



Marine Corps Air Station Yuma
Photovoltaic Perimeter Security Lighting

Commanding General Marine Corps Combat Development Command is responsible to ensure energy efficiency is considered in the development and acquisition of all equipment being fielded through the Marine Corps Systems Command.

Commanding General Training and Education Command will ensure energy efficiency is incorporated into training and education policies and programs without adverse impact to mission execution.

Marine Corps Forces Commands will provide installation program management support and ensure operating forces take action to conserve energy and water without adverse impact to operational missions.

Marine Corps Installation Regional Commands will ensure energy-efficient, safe, and comfortable facilities for Marines, families, and civilian employees; establish programs and procedures directing energy-efficient operation of assets consistent with mission requirements; and ensure energy conservation is a part of all operational procedures and planning criteria.

Director of Public Affairs will facilitate communications with entities outside the Marine Corps to promote the Marine Corps' commitment to the energy efficient operation of installations and energy program achievements.

Installation Commanders will establish specific energy and water conservation strategic installation plans and develop and implement comprehensive installation facilities energy and water management programs to ensure a secure and reliable energy and water supply that fully meets mission and quality of life requirements and reduction mandates. Through life-cycle cost-effective measures they will aggressively pursue energy-efficiency improvements, expand use of renewable energy, reduce use of petroleum in facilities, and reduce water consumption.

Naval Facilities Engineering Command will provide technical and contractual support for the identification, development, and implementation of energy and water conservation measures and renewable energy opportunities on Marine Corps facilities.

Recent USMC Awards for Energy and Water Conservation

SECNAV Energy and Water Management Awards recognize outstanding commitment to energy and water conservation by Navy and Marine Corps activities and ships.

MCAGCC Twentynine Palms – Over the past year (FY 2007), energy intensity (energy usage per square foot) dropped 2.07%. MCAGCC supported a well-rounded program which included capital investment of \$5 million for energy improvements. Focus was on converting several buildings from evaporative cooling to chilled water systems with full Energy Management Control Systems (EMCS) and extending EMCS control to additional buildings. Other projects included recommissioning 15 inoperable solar water heating systems, installing lighting and photocell controls, and upgrading the EMCS controls for a large chiller. The combined utility cost savings is more than \$1 million per year.

Federal Energy and Water Management Awards, sponsored by the U.S. Department of Energy, honor individuals and organizations making significant contributions to the efficient use of energy and water resources in the federal government.

MCB Camp Pendleton (Category: Small Group – Renewable Energy). Energy Conservation Investment Program (ECIP) funding was used to design and construct two solar thermal Photovoltaic (PV) projects at two year-round training pools that typically use natural gas for

water heating and electricity for running pumps and other mechanical equipment. This innovative approach to harvesting solar energy significantly increases the renewable generation capability on Camp Pendleton while reducing operational costs.

MCAS Miramar (Category: Organization – Water Conservation).

The City of San Diego has a large reclaimed water line running parallel to the Station's northern property line. MCAS Miramar was able to tap into the line to provide reclaimed water for a majority of the Station's golf course. The project was a win-win for both the Marine Corps and local government due to mandated water reduction requirements.

Presidential Awards for Leadership in Federal Energy Management honor Federal employees for their support, leadership, and efforts in promoting and improving Federal energy management.

MCAS Miramar. By using energy efficiency tools, the Air Station has dropped to an astounding 49 MBTUs per KSF which places it in the top percentile of all Department of the Navy installations. Major accomplishments are awareness training, retrofitting lighting and HVAC, consolidating chiller and thermal Energy Storage System, installing HVAC occupancy sensors, boiler upgrades, and converting large irrigation watering areas to reclaimed water.



Marine Corps Base Camp Pendleton
Photovoltaic Pool Heating System



Office of the Commandant of the Marine Corps

The Pentagon
Washington, DC